

REMARKS

The pending claims are 1-14. Claims 1-9, 12-14 have been amended. No new matter is introduced therein.

Claims 1-8 and 12-14 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claims 1-8 have been rejected because the Office Action concluded that the terms "grounded antenna" and "ungrounded antenna" were not clear. Claims 1, 5, and 7 have been amended to more clearly distinguish between the terms. Claim 1 now recites a "ground plane," the grounded antenna being disposed on the ground plane, "the ungrounded antenna isolated from said grounded antenna," and the ungrounded antenna "isolated from said ground plane." Claim 5 has been amended to recite a "ground plane" and that "at least one of said ungrounded antennas is isolated from said ground plane." Claim 7 has been amended to recite a "ground plane," that "at least one ungrounded antenna is provided and is isolated from said ground plane," and that the ground plane "partly surround[s] said ungrounded antenna." Accordingly, these claims now recite a ground plane and further recite that an antenna is ungrounded because it is isolated from the ground plane. Since the amendment to claim 1 has clarified the meaning of "grounded antenna" and since the amendments to claims 1, 5 and 7 have clarified the meaning of "ungrounded antenna," it is requested that this basis for the §112 rejection be withdrawn.

Claims 2, 5, 7, 8, 13, and 14 have been rejected because the Office Action concluded that phrases such as "said ungrounded antenna is coupled to said ground via high-frequency waves" recited in claim 2 is unclear in that the phrases do not make it clear how the ungrounded antenna and the ground are coupled. Claim 2 has been amended by changing "coupled to said ground plane" to "communicates with said ground plane." Similar amendments have been made to claims 5, 7, 8, 13, and 14. In view of these amendments, it is requested that the §112 rejection be withdrawn.

Claim 12 has been rejected because "said internal antenna elements" and "the other internal element" have no antecedent basis. Claim 12 has been amended by deleting "internal" from "said internal antenna elements," by changing "two antenna elements" to "a first and a second said antenna elements," by changing "one of said internal antenna elements" to "said first of said antenna elements," and by changing "the other internal antenna element" to "said second antenna element. In view of these amendments, it is requested that this basis for the §112 rejection be withdrawn.

Claims 5-8 have been rejected under 35 U.S.C. §102(e) as being anticipated by Chen (U.S. Patent No. 6,337,670 B1). The rejection is respectfully traversed. Claim 5 has been amended to recite "a ground plane is placed in proximity to at least one of said ungrounded antennas" and that "at least one of said ungrounded antennas is isolated from said ground plane." The "proximity" recitation is supported by, for example, Figure 1. The "isolated" recitation is supported by, for example, page 9, lines 7-8 of the specification. This combination of features is not shown in Chen. The Office Action contends that the antennas are ungrounded. Applicants respectfully disagree. Chen states that the backside of circuit board 10 is grounded. (col. 2, line 19). Chen shows a plurality of antennas 20, 30, 40, 50 mounted on a series of copper sheets 29, 39, 49, 59 which are, in turn, grounded on the back of the circuit board 10. The Office Action concedes that the copper sheets are grounded. Accordingly, Chen does not show an antenna that "is isolated from said ground plane" as now recited in amended claim 5.

In addition, Chen discloses that signals from the antennas communicate electrically with the ground plane by way of the electrical connections from the antennas, to the microstrips 21, 31, 41, 51, and the copper sheets. Claim 5 recites, instead, that the ungrounded antennas communicate with the ground plane via high-frequency waves. Chen does not disclose such a communication between ungrounded antennas and a ground plane. Therefore, claim 5 is not subject to rejection under 35 U.S.C. § 102(e) as being anticipated by Chen. } *functional*

Similarly, claim 7 recites an ungrounded plane "is isolated from said ground plane" and that the ungrounded antenna and the ground plane communicate with each other via high-frequency waves. For the reasons set forth regarding claim 5,

applicants contend that claim 7, along with its dependent claim 8, are not subject to rejection under 35 U.S.C. § 102(e) as being anticipated by Chen.

Further with respect to claim 8, the Office Action contends that Chen shows a ground that "is placed so as to partly surround the ungrounded antenna three dimensionally." Applicants respectfully disagree. Figure 1 of Chen shows that the antennas are mounted on top of the strips and on top of the copper sheets. Chen's specification confirms that the bottom ends of the antennas are connected to the microstrip lines 21, 31, 41, 51 which are, in turn, on top of the copper sheets. Therefore, the ground plane does not "partly surround said ungrounded antenna three-dimensionally" as recited in claim 8 thereby providing another reason why claim 8 is not subject to rejection under 35 U.S.C. § 102(e) as being anticipated by Chen.

Claims 9-10 have been rejected under 35 U.S.C. §102(e) as being anticipated by Liu (U.S. Patent No. 6,222,496 B1). The rejection is respectfully traversed. Claim 9 has been amended by reciting that the wireless terminal unit has "at least first and second antenna elements," that each of the antenna elements has a substrate, a first conductor section, and a second conductor section, and that "a size of said first antenna element is different from a size of said second antenna element." These recitations are supported by page 16, line 17-page 21, line 6 and Figures 11,12. Liu does not disclose a wireless terminal with the features now recited in claim 9. The device in Liu does not have two antenna elements each of which have a substrate or two conductor sections wherein "a size of said first antenna element is different from a size of said second antenna element."

Claim 9 has also been amended to recite a ground plane and that "at least one of said first conductor section and said second conductor section is isolated from said ground plane." These recitations are supported by page 21, line 13-page 22, line 9 of the specification and are not disclosed by Liu.

In view of the above amendments to claim 9, claim 9, and its dependent claim 10, are not subject to rejection under 35 U.S.C. § 102(e) as being anticipated by Liu.

Claims 1-11 and 13 have been rejected under 35 U.S.C. §102(e) as being anticipated by McKivergan (U.S. Patent No. 6,339,402 B1). The rejections are respectfully traversed. The Office Action contends that McKivergan has an ungrounded antenna 24. Applicants respectfully disagree because McKivergan discloses that conductive surface 24 of element 22 "is coupled at two regions to ground plane 14 of the printed wiring board 12 by first and second leg elements 26, 36." (col. 3, lines 36-40). That is, element 24 is a grounded antenna and is not an ungrounded antenna. Furthermore, since claim 1, as amended, now recites that the ungrounded antenna is "isolated from said ground plane," McKivergan does not anticipate that recitation.

In addition, amended claim 1 also recites that the ungrounded antenna is "isolated from said grounded antenna." The Office Action contends that antenna 24 is isolated from the grounded antenna. Applicants respectfully disagree. Instead, McKivergan discloses that "the first and second conductive surfaces 24, 44 of the first and second conducting elements 22, 42 are capacitively coupled to each other by a bridge capacitor 60." (col. 4, lines 36-38). Therefore, instead of being isolated from each other, as recited in amended claim 1, McKivergan discloses that they are coupled to each other by bridge capacitor 60.

For the above reasons, claim 1, as amended, and its dependent claims 2-4 are not subject to rejection under 35 U.S.C. § 102(e) as being anticipated by McKivergan.

Similarly, claim 5, as amended, now recites that "at least one of said ungrounded antennas is isolated from said ground plane;" and claim 7, as amended, now recites that "at least one ungrounded antenna. . .is isolated from said ground plane." For the reasons set forth with respect to amended claim 1, claims 5 and 7 are not anticipated by McKivergan. Therefore, claims 5 and 7, along with their dependent claims 6 and 8, are not subject to rejection under 35 U.S.C. § 102(e) as being anticipated by McKivergan.

Claim 9, as amended, now recites a ground plane and that "at least one of said first conductor section and said second conductor section is isolated from said

ground plane." As discussed above, McKivergan does not disclose at least one conductor section that "is isolated from said ground plane." The Office Action refers to Figures 6 and 7 of McKivergan upon which to base the rejection of claim 9. However, the discussion of those figures at col. 6, lines 4-22 expressly discloses that conductive surfaces 24, 44, and conducting elements 22, 42 are connected to ground plane 14 through two different circuits. Since claim 9, as amended, recites "at least one of said first conductor section and said second conductor section is isolated from said ground plane," claim 9 is not anticipated by McKivergan. Therefore, claim 9, along with its dependent claims 10-14, are not subject to rejection under 35 U.S.C. § 102(e) as being anticipated by McKivergan.

The Office Action has rejected claims 3, 4, and 6 because each claim contains a recitation that "said device is structured so as to." Each claim has been amended by deleting that phrase and by adding two features. The first feature recites that "elements of said grounded antenna and said ungrounded antenna are symmetrical." This recitation is supported by page 20, lines 21-23. The second feature recites that "an angle between said grounded antenna and said ungrounded antenna is established at 90°." This recitation is supported, for example, by page 10, line 20, page 12, line 20, page 14, line 4. Since these claims no longer have the phrases that had been objected to and, instead, recite structural features, applicants request that the rejection of these claims be withdrawn.

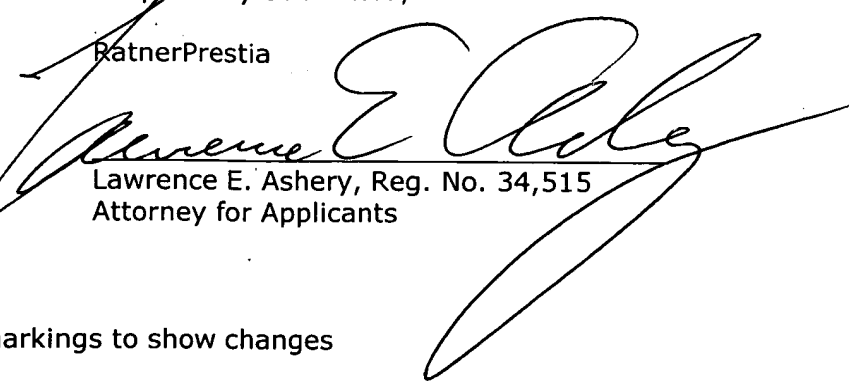
Claims 12 and 14 have been rejected under 35 U.S.C. §103(a) as being unpatentable over McKivergan in view of Muramoto et al. (U.S. Patent No. 6,326,924 B1). These claims are dependent from amended parent claim 9 which is no longer subject to rejection. Muramoto does not teach the combination now recited in claim 9 and does not overcome the deficiencies in McKivergan. Therefore, claims 12 and 14 are not subject to rejection under 35 U.S.C. § 103(a) as being unpatentable over McKivergan in view of Muramoto et al.

The prior art made of record and not relied upon is not considered any more pertinent to applicants' disclosure than that already cited.

For all the foregoing reasons, applicants respectfully solicit allowance of the entire application.

Respectfully Submitted,

RatnerPrestia

  
Lawrence E. Ashery, Reg. No. 34,515  
Attorney for Applicants

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Enclosure: Version with markings to show changes

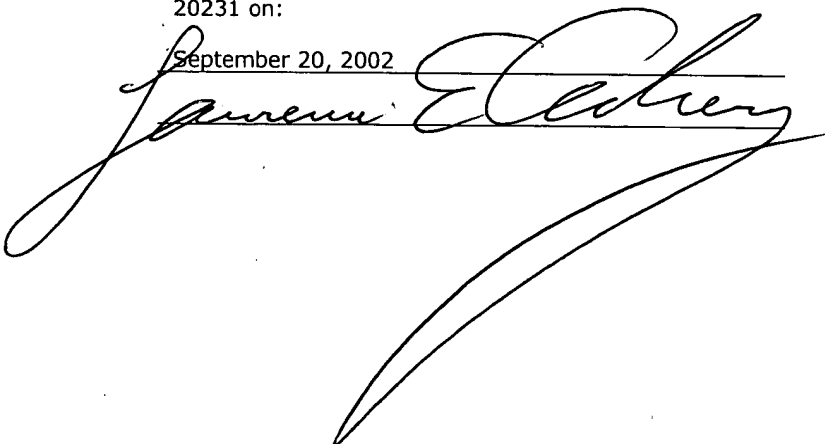
Dated: September 20, 2002

P.O. Box 980  
Valley Forge, PA 19482-0980  
(610) 407-0700

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Lawrence E. Ashery

VERSION WITH MARKINGS TO SHOW CHANGES MADECLAIMS

1           1.       (Amended) A diversity wireless device for providing diversity using a  
2       plurality of antennas comprising:

3                   a substrate;

4                   a ground plane disposed on said substrate;

5                   at least one grounded antenna by being disposed on said ground plane  
6       [substrate];

7                   at least one ungrounded antenna disposed on said substrate, [and]  
8       said ungrounded antenna isolated from said grounded antenna and isolated from  
9       said ground plane, whereby said grounded antenna and said ungrounded antenna  
10      provide a diversity gain relative to signals received by said diversity wireless device.

1           2.       (Amended) The diversity wireless device as described in Claim 1  
2       wherein

3                   [a] said ground plane is placed in proximity to said ungrounded  
4       antenna and said ungrounded antenna [is coupled to] communicates with said  
5       ground plane via high-frequency waves.

1           3.       (Amended) The diversity wireless device as described in Claim 1  
2       wherein

3                   [said device is structured so as to obtain an efficient diversity effect by  
4       maneuvering antenna directivity by changing at least one of] elements of said  
5       grounded antenna and said ungrounded antenna are symmetrical and an angle

6 between said grounded antenna and said ungrounded antenna is established at 90° [,  
7 and feeding points of said antennas].

1 4. (Amended) The diversity wireless device as described in Claim 2  
2 wherein

3 [said device is structured so as to obtain an efficient diversity effect by  
4 maneuvering antenna directivity by changing at least one of] elements of said  
5 grounded antenna and said ungrounded antenna are symmetrical and an angle  
6 between said grounded antenna and said ungrounded antenna is established at 90° [,  
7 and feeding points of said antennas].

1 5. (Amended) A diversity wireless device for providing diversity using a  
2 plurality of ungrounded antennas wherein

3 a ground plane is placed in proximity to at least one of said  
4 ungrounded antennas, said at least one of said ungrounded antennas is isolated from  
5 said ground plane, and said at least one of said ungrounded antennas [is coupled to]  
6 communicates with said ground plane via high-frequency waves.

1 6. (Amended) The diversity wireless device as described in Claim 5  
2 wherein

3 [said device is structured so as to obtain an efficient diversity effect by  
4 maneuvering antenna directivity by changing at least one of] elements of said  
5 grounded antenna) and said ungrounded antenna are symmetrical and an angle  
6 between said ungrounded antennas is established at 90° [and feeding points thereof].

1 7. (Amended) A diversity wireless device for providing diversity using a  
2 plurality of antennas wherein

3 a ground plane is disposed on a substrate;



4 at least one ungrounded antenna is provided and is isolated from said  
5 ground plane, [a] said ground plane is placed partly surrounding said ungrounded  
6 antenna, and said ungrounded antenna and said ground plane [are coupled to]  
7 communicate with each other via high-frequency waves.

1 8. (Amended) The diversity wireless device as described in Claim 7  
2 wherein

3 said ground plane is composed of a plurality of laminated layers and is  
4 placed so as to partly surround said ungrounded antenna three- dimensionally, and  
5 said ungrounded antenna and said ground plane [are coupled to] communicate with  
6 each other via high-frequency waves.

1 9. (Amended) A wireless terminal unit having [an] first and second  
2 antenna elements, each of said antenna elements including:

3 (c) a substrate;

4 (d) a ground plane disposed on said substrate;

5 [(b)](c) a first conductor section substantially in parallel to said  
6 substrate; and

7 [(c)](d) a second conductor section successively formed from said first  
8 conductor section and angularly arranged relative to said substrate,

9 wherein a size of said first antenna element is different from a size of  
10 said second antenna element, and

11 wherein at least one of said first conductor section and said second  
12 conductor section is isolated from said ground plane.

1 12. (Amended) The wireless terminal unit as described in Claim 10  
2 comprising:

3 at least [two] a first and a second said antenna elements provided in  
4 said unit and a connector with a switch for connecting to an external antenna

5 wherein said unit is structured so as to switch [one] said first of said  
6 [internal] antenna elements in said unit to said external antenna and to provide  
7 diversity using said external antenna and [the other internal] said second antenna  
8 element when said external antenna is connected to said connector.

1 13. (Amended) The wireless terminal unit as described in Claim 11  
2 wherein

3 said antenna elements are ungrounded, a ground is placed in  
4 proximity to at least one of said ungrounded antenna elements, and said ungrounded  
5 antenna [is coupled to] communicates with said ground via high-frequency waves.

1 14. (Amended) The wireless terminal unit as described in Claim 12.  
2 wherein

3 said antenna elements are ungrounded, a ground is placed in  
4 proximity to at least one of said ungrounded antenna elements, and said ungrounded  
5 antenna [is coupled to] communicates with said ground via high-frequency waves.